

REMARKS

By this Amendment, claims 1-25 are cancelled, claims 26-37 are amended, and claims 38-53 are added. Thus, claims 26-53 are active in the application. Reexamination and reconsideration of the application are respectfully requested.

The specification and abstract have been carefully reviewed and revised in order to correct grammatical and idiomatic errors in order to aid the Examiner in further consideration of the application. The amendments to the specification and abstract are incorporated in the attached substitute specification and abstract. No new matter has been added.

Also attached hereto is a marked-up version of the substitute specification and abstract illustrating the changes made to the original specification and abstract.

On page 2 of the Office Action, the Examiner required Figures 13 and 14 to be labeled as "Prior Art." In response to this requirement, replacement formal drawings of Figures 1-14 are submitted concurrently herewith under a separate cover letter in order to label Figures 13 and 14 as "Prior Art." Approval of the replacement formal drawings is respectfully requested.

On page 2 of the Office Action, the Examiner objected to the drawings for not showing every feature of the invention recited in the claims. In particular, the Examiner asserted that the "one or more package components" recited in original claims 26-28 and 35-37 are not illustrated in the drawings. It is believed that the Examiner meant to identify claims 29-31 instead of claims 26-28 in the objection to the drawings since claims 26-28 do not recite "one or more package components" whereas claims 29-31 recite "one or more package components."

For the following reasons, the Applicants respectfully disagree with the Examiner's assertion that the drawings do not illustrate the "one or more package components" recited in original claims 29-31 and 35-37.

The invention of independent claim 29 is illustrated in Figure 10, which illustrates an optical module 402 that includes the subassembly 400 of Figure 9 being "packaged by using package parts [components] constituting the package 450" (see lines 27-28 on page 32 of the original specification, corresponding to lines 10-12 on page 33 of the substitute specification).

Beginning at line 30 on page 32 of the original specification (line 14 on page 33 of the substitute specification), the package 450 of optical module 402 is described as including the following “parts” (components): a cap 452, a barrier wall 453, a header 454, a stem 456 and electrode terminals 458. The cap 452, the barrier wall 453, the header 454, the stem 456 and the electrode terminals 458 are clearly illustrated in Figure 10 as being components of the package 450. In fact, a bracket surrounding reference numerals 452, 453, 454, 456 and 458 is illustrated in Figure 10 to denote that the elements corresponding to these reference numerals are components of the package 450.

Accordingly, the “one or more package components” recited in independent claim 29 are clearly illustrated in Figure 10.

The invention of independent claim 35 is illustrated in Figure 12, which illustrates an optical module 502 that includes the subassembly 500 of Figure 11 being “packaged by using the package parts [components] constituting the package 550” (see lines 12-13 on page 38 of the original specification, corresponding to lines 29-30 on page 38 of the substitute specification).

Beginning at line 19 on page 37 of the original specification (line 6 on page 38 of the substitute specification), the package 550 of the optical module 502 is described as including the following “parts” (components): a flat window 551, a cap 552, a barrier wall 553, a header 554, a stem 556 and electrode terminals 558. The flat window 551, the cap 552, the barrier wall 553, the header 554, the stem 556 and the electrode terminals 558 are clearly illustrated in Figure 12 as being components of the package 550. In fact, a bracket surrounding reference numerals 551, 552, 553, 554, 556 and 558 is illustrated in Figure 12 to denote that the elements corresponding to these reference numerals are components of the package 550.

Accordingly, the “one or more package components” recited in independent claim 35 are clearly illustrated in Figure 12.

In view of the above, the Applicants respectfully request the Examiner to withdraw the objection to the drawings since the “one or more package components” recited in claims 29-31 and 35-37 are clearly illustrated in the drawings.

On page 3 of the Office Action, claims 29-31 and 35-37 were objected to because the limitations “one or more package components” in each of independent claims 29 and 35 were not illustrated in the drawings.

However, in view of the foregoing reasons, the drawings clearly illustrate the one or more package components comprised in the optical module of claim 29 and the optical module of claim 35. Therefore, the Applicants respectfully request that the Examiner withdraw the objection to the claims.

On page 3 of the Office Action, claims 26-29, 31-35 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Korenaga et al. (U.S. Patent Application Publication No. 2003/0118294). This rejection is respectfully traversed for the following reasons.

The present invention provides a novel improvement over conventional subassemblies and optical modules in that the present invention adopts a unique lens element which includes a lens portion that is formed at a surface of an optical substrate, and a projection portion that comes into contact with a groove of the supporting substrate when the lens element is mounted.

The lens element of the present invention is adopted instead of the conventional lenses such as a ball lens with a significant external diameter so as to provide a new and improved subassembly and optical module that enable highly accurate positioning and miniaturization.

The unique lens element of the present invention is positioned relative to a light emitting element and includes a lens portion formed at a surface of an optical substrate to cause a light flux to exit in a direction which is different from the direction of an incident light flux. The projection portion comes into contact with the groove at the supporting substrate when the lens element is mounted. Furthermore, the lens element includes a handling portion extending in a direction orthogonal to a direction in which the groove extends.

Therefore, by avoiding the use of conventional ball lenses with a significant external diameter, the lens element of the present invention can be accurately positioned in the groove and achieve sought after miniaturization.

Independent claims 26, 29, 32 and 35 achieve the above effects of the present invention.

Claims 26 and 29 each recite a lens element including a lens portion formed at a surface of an optical substrate and a projection portion that comes in contact with the groove at the supporting substrate when the lens element is mounted. Claims 26 and 29 define that lens element is positioned relative to the light emitting element and is operable to convert divergent light emitted from the light emitting element to substantially parallel light.

Claims 32 and 35 recite a first lens element including a first lens portion formed at a surface of an optical substrate and a first projection portion that comes into contact with the first groove when the first element is mounted. Claims 32 and 35 define that the first lens element is positioned relative to the light emitting element and is operable to convert divergent light emitted from the light emitting element to substantially parallel light.

Claims 32 and 35 also each recite a second lens element including a second lens portion formed at a surface of an optical substrate and a second projection portion that comes into contact with the second groove when the second lens element is mounted. Claims 32 and 35 each define that the second lens element is operable to convert the substantially parallel light to convergent light.

The lenses of Korenaga et al. are each disclosed as ball lenses with a significant external diameter and therefore do not constitute the lens elements recited in claims 26, 29, 32 and 35. Furthermore, even if the grooves of the optical package substrate 81 illustrated in Figure 8 of Korenaga et al. are combined with the optical package substrate 120 of Figure 12, the first and second lenses of Korenaga et al. are not disclosed as including a lens portion formed at a surface of an optical substrate and a projection portion that comes into contact with the respective grooves as defined in claims 26, 29, 32 and 35.

Accordingly, Korenaga et al. does not disclose or suggest each and every limitation of claims 26, 29, 32 and 35. Moreover, one skilled in the art would not substantially modify the invention of Korenaga et al. to arrive at the inventions of claims 26, 29, 32 and 35 since the use of ball lenses with significant external diameters in

Korenaga et al. defeats the object of the present invention to enable highly accurate positioning and miniaturization.

Therefore, for at least the foregoing reasons, claims 26, 29, 32 and 35 are clearly patentable over Korenaga et al.

On page 6 of the Office Action, claims 30 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Korenaga et al. in view of Yonemura (U.S. 6,843,609). As demonstrated above, Korenaga et al. does not disclose or suggest each and every limitation of claims 26, 29, 32 and 35.

Yonemura's only relation to the present invention is that it provides an optical module. However, similar to Korenaga et al., Yonemura does not disclose or suggest the lens elements of the present invention for enabling highly accurate positioning and miniaturization.

Accordingly, no obvious combination of Korenaga et al. and Yonemura would result in the inventions of claims 26, 29, 32 and 35. Therefore, claims 26, 29, 32 and 35 are clearly patentable over any combination of Korenaga et al. and Yonemura since Korenaga et al. and Yonemura, either individually or in combination, clearly fail to disclose or suggest each and every limitation of claims 26, 29, 32 and 35.

Furthermore, it is submitted that the clear distinctions discussed above are such that a person having ordinary skill in the art at the time the invention was made would not have been motivated to modify Korenaga et al. and Yonemura in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 26, 29, 32 and 35.

Therefore, it is submitted that the claims 26, 29, 32 and 35, as well as claims 27-28, 30-31, 33-34 and 36-53 which depend therefrom, are clearly allowable over the prior art as applied by the Examiner.

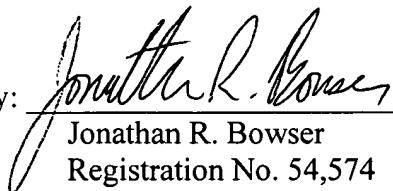
In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the

Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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AMENDMENTS TO THE DRAWINGS

Replacement formal drawings of Figures 1-14 are submitted concurrently herewith under a separate cover letter.